

**REMARKS**

Applicants request favorable reconsideration and allowance of this application in view of the foregoing amendments and the following remarks.

Claims 1, 4-20, 23, 24, 26-31 and 33-34 are now pending in this application, with claims 1 and 23 being independent. Claims 2, 3, 21, 22, 25, 32 have been cancelled, without prejudice to or disclaimer of the subject matter recited therein. Claims 1, 4-15, 17-20, 23-24, and 26-31 have been amended and claims 33 and 34 have been added. The claim amendments and claim additions place the claims in better form under U.S. practice and eliminate multiple dependent claims that depended from other multiple dependent claims. Support for both the claim amendments and claim additions can be found throughout the specification and in the originally-filed claims. Support for the claim amendments to claim 1 can be found, for example, at pp. 22-23 of the specification, as well as in Figures 2, 4(a) to 4(c), and 5(a) and 5(b). Also, support for the amendments made to claims 28 and 29 can be found, for example, at pages 25-26 of the specification. Accordingly, no new matter has been added to this application.

In more detail, independent claim 1, as amended, now recites a gene detecting chip comprising: a body part having a plurality of pin electrodes on an inside surface thereof; a frame part having a recess on an inner surface thereof and being freely attachable to and detachable from said body part, said frame part being capable of accepting the pin electrodes and of being filled with a nucleic acid sample; and a common electrode being a counter electrode for the pin electrodes, wherein said common electrode is arranged within the recess in a manner that said common electrode does not come into contact with the pin electrodes.

In addition, independent claim 23, as amended, now recites a detecting chip for detecting one base substituted SNP and spot mutation in genes, comprising: a main body part and a frame part that are freely attachable to and detachable from each other, characterized in that: said main body part has a multiplicity of pin electrodes that are protruding measurement poles arranged in a matrix on the inner surface thereof; said frame part has a recess on the inner surface thereof, that is capable of accepting said multiplicity of pin electrodes when said main body part is mounted thereon and is capable of being filled with a nucleic acid sample; a common electrode, that is a counter electrode deployed so as not to contact said pin electrodes, is provided in said recess; and PCR products or oligonucleotides having different nucleotide sequences are

immobilized to said pin electrodes; wherein voltages are applied between said common electrode and said pin electrodes so as to enable detection of currents.

In the non-final Office Action dated November 7, 2003, originally-filed claims 1-32 have been rejected. Claims 4-22 and 25-32 have been objected to under 37 C.F.R. §1.75(c) as being in improper form because a multiple dependent claim cannot depend from another multiply dependent claim. Accordingly, these claims were not treated further on the merits. As suggested earlier, the claims have been amended, as necessary, to eliminate multiple dependent claims that depend from other multiple dependent claims. Accordingly, Applicants respectfully request that all of the claims now pending in this application be considered fully on their merits.

In addition, originally-filed claims 1-3 and 23-24 have been rejected in the Office Action under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,340,568 B2 to Hefti. Finally, originally filed claims 1-3 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,048,692 to Maracas et al. in view of U.S. Patent No. 6,368,851 to Baumann et al. Each of these rejections is respectfully traversed for the reasons provided below.

According to Applicants understanding, the Hefti patent provides various methods of analyzing nucleic acids utilizing a system which is sensitive to the dielectric properties of molecules and binding complexes, such as hybridization complexes formed between a nucleic acid probe and a nucleic acid target. Figures 1A and 1B of the Hefti patent are said to describe embodiments of a bio-assay system. More specifically, col. 12, lines 35 to 40 of the Hefti patent indicate that the bio-assay system “includes a bio-assay device **150** coupled to the transmission lines **120**. The bio-assay device **150** contains a supporting substrate **151** onto which an interface transmission line is disposed. The interface transmission line **153** forms an interface for supporting the propagation of a test signal.” Moreover, column 13, lines 37-40 describe Figure 1B as showing: “an array of resonant microstrip circuits **170**. Each resonant circuit **170** consists of a transmission line **172** terminating in an open-circuited stub **176**.” In addition, col. 41, lines 17-25 of the Hefti patent indicate that Figure 13A shows that:

The 1xN input switch **1702** routes the incoming test signal to the desired array element within array **1703**. The MBR in the array element **1703**, modulates the test signal according the dielectric properties of the molecular binding events which make up the MBR. An Mx1 output switch **1704** routes the modulated test signal to a

detector of the measurement system **1540**. An analyzer of the test system **1540** compares the input and modulated test signals to determine the measured signal response.

On the other hand, the Hefti patent indicates that Figure 13F shows a two-dimensional bio-assay array which “includes a first input/output (I/O) axis **1772** and a second I/O axis **1774** for inputting/outputting test signals.”

Based on Applicants understanding of the Hefti patent, that document does not disclose the various features of Applicants’ claimed invention, particularly as claimed in independent claims 1 and 23, as amended. For example, Applicants do not believe that the Hefti patent teaches a gene detecting chip comprising, among other features, a common electrode that is a counter electrode for the pin electrodes, wherein said common electrode is arranged within the recess in a manner that said common electrode does not come into contact with the pin electrodes, as recited in claim 1. Similarly, Applicants do not believe that the Hefti patent teaches a gene detecting chip comprising, among other features, a common electrode provided in a recess that is a counter electrode deployed so as not to contact said pin electrodes, as recited in claim 23, as amended. As such, Applicants believe that the rejection under 35 U.S.C. §102(e) based on the Hefti patent is overcome and, therefore, this rejection should be withdrawn.

Applicants now wish to address the rejection in the Office Action of originally-filed claims 1-3 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,048,692 to Maracas et al. in view of U.S. Patent No. 6,368,851 to Baumann et al. Based on Applicants understanding, the Maracas et al. patent relates to sensors for electrically sensing binding events with supported molecular receptors. Moreover, Applicants find that the Maracas et al. patent teaches, at col. 2, lines 20-35, that the sensor includes a first electrode embedded in a gel and, optionally, a second electrode that “assists in electrically sensing the hybridization or binding” of a molecule to a molecular receptor. The Office Action makes reference to the first and second electrodes found in the sensors portrayed in Figures 3 and 5 of the Maracas et al. patent. Also, col. 7, lines 16-29 of the Maracas, et al. patent suggest that these sensors can be included in an array of sensors. In such a scenario: “a plurality of sensors ... can have their second electrodes interconnected to form a single ground electrode. Each sensor in the array is addressed by the single ground electrode and an external contact associated with its first electrode.” However, as

mentioned with regards to the Hefti patent, Applicants do not find that the Maracas et al. patent discloses the various features of Applicants' claimed invention. For example, Applicants do not find that the Maracas et al. patent teaches a gene detecting chip comprising, among other features, a common electrode that is a counter electrode for the pin electrodes, wherein said common electrode is arranged within the recess in a manner that said common electrode does not come into contact with the pin electrodes, as recited in claim 1, as amended.

Moreover, Applicants do not believe that this deficiency in the Maracas et al. disclosure is taught by Baumann et al., which Applicants understand, relates to a method for measuring a state variable of a biological cell located in a nutrient medium and supported on and adhering to a support area. Applicants submit that measuring a state variable of a biological cell is sufficiently different from analyzing and detecting genes, such that it is not appropriate to combine the Baumann et al. patent with the Maracas et al. patent. In addition, Columns 13, lines 13-15 of the Baumann et al. patent suggest that Figure 11 shows an electroporation electrode, whereas column 14, lines 55-60, suggest that Figure 17 illustrates several measuring and electroporation electrodes. Yet, Applicants do not find that that the Baumann et al. patent teaches a gene detecting chip comprising, among other features, a common electrode that is a counter electrode for the pin electrodes, wherein said common electrode is arranged within the recess in a manner that said common electrode does not come into contact with the pin electrodes, as recited in claim 1, as amended.

Consequently, Applicants do not find that the Maracas et al. patent, taken alone or in combination with the Baumann et al. patent, teach Applicants' claimed invention.


Accordingly, Applicants submit that this Amendment, together with its attachments, clearly places this application in condition for allowance, and that both the independent and the dependent claims should be deemed allowable. The dependent claims also should be allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims.

Applicants request that the Examiner contact Applicants' undersigned representative should any matters be deemed outstanding, precluding allowance of this application. Applicants further request favorable reconsideration, withdrawal of the rejections set forth in the outstanding Office Action, and an early notice of allowance.

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Respectfully submitted,

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